

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

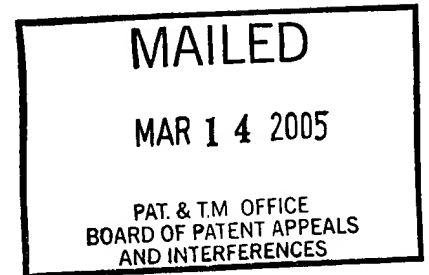
UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte KATSUNORI ITOU, KIKUO MAEDA, TOSHIYA KINAMI,
and SADAYUKI NAKAMURA

Appeal No. 2005-0669
Application No. 09/582,982

ON BRIEF



Before CAROFF, TIMM, and JEFFREY T. SMITH, Administrative Patent Judges.

CAROFF, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1-2, all the pending claims in appellants' application.

The appealed claims relate to a steel product having a particular elemental composition and forming a part of an antifriction bearing.

Appellants stipulate on page 4 of their brief that the appealed claims stand or fall together for purposes of this

appeal. Accordingly, we shall limit our consideration to independent claim 1, which reads as follows:

1. A part of an antifriction bearing for a high temperature having an inner ring, an outer ring and a rolling element,

consisting of a steel product containing C by at least 0.8% and not more than 1.3%, Si by at least 0.5% and not more than 3.0%, Mn by at least 0.2% and not more than 1.5%, P by not more than 0.03%, S by not more than 0.03%, Cr by at least 0.3% and not more than 5.0%, Ni by at least 0.53% and not more than 3.0%, Al by not more than 0.050%, Ti by not more than 0.003%, O by not more 0.0015% and N by not more than 0.015% in mass % as the contents of alloying elements with the rest consisting of Fe and unavoidable impurities and having a structure subjected to tempering after quench hardening or carbonitriding, wherein the hardness after said tempering is at least HRC 58, when tempered at a temperature in a range of 180°C to 350°C, and the maximum carbide size is not more than 8 μm .

The prior art references relied upon by the examiner are:

Ochi et al. (Ochi)	5,705,124	Jan. 6, 1998
Adachi et al. (Adachi) ¹ (published Japanese Patent Application)	06-293939	Oct. 21, 1994

The following reference has been cited by the appellants:

Mitamura et al. (Mitamura)	5,989,694	Nov. 23, 1999
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¹Following the convention established in the examiner's answer and the brief, we refer to this reference by the first name of the first-listed inventor.

Also, any citations by us to this reference are to the pages of the English translation provided by the examiner.

All of the appealed claims stand rejected under 35 U.S.C. § 103 for obviousness in view of Adachi with support from Ochi.²

We have carefully considered the issues in this case in light of the evidentiary record and the opposed positions of the appellants and the examiner on appeal. Having done so, we conclude that the examiner has established a prima facie case of obviousness which is not outweighed by evidence of nonobviousness relied upon by the appellants. Accordingly, we shall affirm the sole rejection at issue.

Since we are in substantial agreement with the examiner's position, as set forth in the examiner's answer, we adopt that position as our own. Indeed, the answer includes an exceptionally thorough and cogent analysis and treatment of the issues on appeal. For that reason, we offer the following remarks solely for the purpose of emphasis:

As the examiner indicates, Adachi discloses a steel product for use in bearing parts and which has an elemental composition essentially as claimed, with the notable exception that the Si component is limited by Adachi to less than 0.5% of the steel

²A second rejection under 35 U.S.C. § 103, based in part upon a primary reference to Takata et al., has been withdrawn as stated on page 4 of the examiner's answer.

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product; whereas appellants' claims require the Si content to be "at least 0.5% and not more than 3.0%." There is no dispute that the other elemental components disclosed by Adachi satisfy the limitations embodied in claim 1. In particular, the examiner relies upon Adachi steel product no. 6 (Table 1), with an Si content of 0.42%, as exemplary of the compositions taught by Adachi.

As noted by the examiner, Ochi (col. 1, ll. 5-10) shows that bearing steel is used in bearing parts such as outer rings, inner rings, and rollers or balls.

We agree with the examiner that it would have been prima facie obvious, within the purview of 35 U.S.C. § 103, to provide the Adachi steel product with a Si content of "at least 0.5%" since the Si content specifically taught by Adachi, i.e., "less than 0.5%," (abstract; p. 4, numbered paragraph 11), is so close to that required by instant claim 1 that an ordinary artisan would have been motivated to employ slightly higher amounts of Si with the expectation of realizing essentially the same properties. In this regard, see Titanium Metals Corp. v. Banner, 778 F.2d 775, 782-83, 227 USPQ 773, 779 (Fed. Cir. 1985); and In re Mills, 470 F.2d 649, 652, 176 USPQ 196, 198 (CCPA 1972).

The holding of obviousness is reinforced by the recognition in the prior art that the selection of a particular Si content is governed by making a trade-off between competing properties. In this regard, as noted by the examiner, Adachi (p. 4, numbered paragraph 11) recognizes that selection of a particular Si content represents a trade-off between "resistance-to-temper-softening" and "cutting ability, cold-working nature, and warm working nature." According to Adachi, the optimum balance of properties lies at an Si content of about 0.5%.

In this sense, Mitamura, although relied upon by the appellants, is consistent with the "trade-off" rationale espoused by the examiner. Mitamura (col. 4, ll. 33-40) merely affirms that a steel product with an Si content of less than 0.5% will suffer some reduction in high temperature hardness. No doubt this will be compensated by an increase in workability or machineability in accordance with the teachings of Adachi.

Where any particular artisan would draw the line would necessarily depend upon the mix of properties desired in a particular environment. Certainly, appellants have adduced no evidence to demonstrate that, with respect to Si content, an

optimum balance of properties, or the so-called "saturation point," would be any different than what would have been expected from the teachings of Adachi and Mitamura.

Appellants rely (in their reply brief) upon the comparative data presented in Tables 1, 3 and 4 of their specification to demonstrate the attainment of superior rolling fatigue life by using steel products having a Ni content within the claimed range as compared to use of steel products containing significantly less Ni.

In our opinion, the evidence relied upon by the appellants is unpersuasive for the following reasons:

First of all, the evidence proffered by the appellants is not relevant to the principal contested issue before us, namely, the question of obviousness relating to adjustment of Si content. Since all the steel specimens specifically relied upon by appellants (F, G, P) have an Si content within the claimed range, appellants have given us no basis to weigh the effect on rolling fatigue life when Si content is below the claimed range. Moreover, none of appellants' comparative specimens correspond to the closest prior art, i.e., Adachi specimen no. 6 (Si content=0.42%).

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Additionally, comparative specimen P differs from inventive specimens F and G not only in terms of Ni content, but also in terms of C, Mn, P, S, Al, and N content. Thus, the cause and effect sought to be proven is lost here in a welter of unfixed variables. See In re Heyna, 360 F.2d 222, 228, 149 USPQ 692, 697 (CCPA 1966); In re Dunn, 349 F.2d 433, 439, 146 USPQ 479, 483-84 (CCPA 1965).

For all of the foregoing reasons, as well as the reasons set forth in the examiner's answer, the decision of the examiner is affirmed.

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No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

Marc L. Caroff

MARC L. CAROFF //)
Administrative Patent Judge)

Catherine Anne

CATHERINE TIMM)
Administrative Patent Judge)

BOARD OF PATENT
APPEALS AND
INTERFERENCES

Henry T. Smead

JEFFREY T. SMITH)
Administrative Patent Judge)

MLC : hh

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MCDERMOTT, WILL & EMERY
600 13TH STREET, N.W.
WASHINGTON, D.C. 20005-3096